

Effect On Postoperative Pain After Topical Application Of Local Anesthetics In The Tonsillar Fossa After Tonsillectomy

Ahmed El Daly¹, Moustafa Abdelnaby², Pola Emad³

¹⁻³Otolaryngology Department, Faculty of Medicine, Alexandria University, Egypt

Email: polaemad.pe@gmail.com

ABSTRACT

Background: Tonsillectomy is one of the most commonly performed surgeries in ENT practice. Despite improvements in anesthetic and surgical techniques, post tonsillectomy morbidities continue to be a significant clinical concern. Pain is the cause of most of the post-operative morbidity after tonsillectomy. An effective pain therapy to block or modify the physiological responses to stress has become an essential component of modern pediatric anesthesia and surgical practice.

Aim: The present study compares the results between the effects of Lidocaine 2% infiltration, Lidocaine 10 % spray and Bupivacaine 0.5% spray in tonsillar bed after tonsillectomy on postoperative pain.

Materials and Methods: 120 patients aged 5-18 years who were candidates for tonsillectomy at Otorhinolaryngology department of Alexandria Main University Hospital. Patients were randomly divided into three groups, 40 patients each. Group A received Lidocaine 2% (Xylocaine) peritonsillar infiltration 2 cc in one tonsillar bed and posterior pillar, Group B received Lidocaine 10% (Xylocaine) spray 2 puff in one tonsillar bed, Group C received Bupivacaine 0.5% (Marcaine) solution 2cc in one tonsillar bed spray by syringe and the other tonsillar bed in each group receives pack with similar amount of normal saline for five minutes as a control group after tonsillectomy before recovery from anaesthesia.

Results: There was no statistical difference between the three studied groups as regards age and sex. There is significant statistical difference according to the frequency of throat pain and ear pain by comparing cases and controls of each group within 1st 24 hours after surgery. It appears that increased frequency of postoperative throat pain and ear pain is present with control side (saline).

Conclusion: Topical application of the tonsillar bed with local anaesthetic after tonsillectomy results in significant reduction of postoperative throat pain and referred otalgia, and should be used during surgery for tonsillectomy.

Keywords: Tonsillectomy; Anesthetics, Local; pain, postoperative

INTRODUCTION

Tonsillectomy is considered to be the most common surgery in ENT practice. There are number of absolute and relative indications but practically the most common indications for performing this surgery are recurrent tonsillitis and obstructive sleep apnea.

Various techniques have been used to perform this surgery; however, dissection and Ligation of superior and inferior poles remains the most commonly used method.^(1, 2)

How to Cite this Article:

Ahmed El Daly, Moustafa Abdelnaby, Pola Emad (2018). Effect on Postoperative Pain After Topical Application Of Local Anesthetics In The Tonsillar Fossa After Tonsillectomy. *Biolife*. 6(3), 15-24.

DOI: [10.5281/zenodo.7403055](https://doi.org/10.5281/zenodo.7403055)

Received: 16 May 2018; Accepted: 27 June 2018;

Published online: 21 July, 2018

Despite improvements in anesthetic and surgical techniques, post tonsillectomy morbidities continue to be a significant clinical concern.^(3, 4)

Pain is the cause of most of the postoperative morbidity after tonsillectomy. Pain is an unpleasant emotional experience associated with potential tissue damage and interfere with normal daily activity and work.⁽⁵⁾

An effective pain therapy to block or modify the physiological responses to stress has become an essential component of modern pediatric anesthesia and surgical practice.⁽⁶⁾

Pain in the throat restricts oral intake and results in less activity of the constrictor muscles of the pharynx and predispose to bleeding secondary to infection.⁽⁷⁾ Post-operative pain is variable regardless of differences in technique (e.g., cautery, laser, or dissection) and different anesthetics, either local anesthetic (LA) or general anesthetics (GA) where it is least in surgical Dissection and ligation method and most in laser and monopolar cautery.⁽⁸⁻¹³⁾

Relief of pain after tonsillectomy is thus a major concern to allow the patient to proper feeding and to avoid other complications. Recent experimental data, in both humans and animals, suggest that, even during surgery under GA, pain impulses from peripheral nerve stimulation travel into the central nervous system (CNS).⁽¹⁴⁾ The physiological changes in the CNS lead to the formation of a neural hyperexcitable state, resulting in prolongation of postoperative pain.⁽¹⁴⁾ Blockade of peripheral nerve pain impulses to the CNS during surgery should prevent formation of this hyperexcitable state and subsequently, result in reduction of post-operative pain.⁽¹⁵⁾

Researchers have tried different options for pain reduction after tonsillectomy like use of topical lignocaine, ropivacaine, pethidine, dexamethasone and Bupivacaine.⁽¹⁶⁻²⁰⁾ Both Lidocaine and Bupivacaine are of the Amide group of local anesthetics.⁽²¹⁾ Local and regional anesthesia and analgesia techniques depend on a group of drugs—local anesthetics—that transiently inhibit sensory, motor, or autonomic nerve function, or a combination of these functions, when the drugs are injected or applied near neural tissue.

Lidocaine (Xylocaine, Astra Zenka, Sweden) is a common local anesthetic agent which is widely applied. It is available in many concentrations such as 0.5%, 1%, 1.5%, 2%, 4%, 5%, 10%. Its maximum dose 4.5 mg /kg (without epinephrine), 7mg/ kg (with epinephrine). Above that dose, it is toxic. Its onset of action within 2 min and its duration of action extends up to 180-300 min (3- 5 hr).⁽²²⁾ Bupivacaine (Marcaine) because of its rapid onset of action and prolonged duration is gaining popularity as an effective method for pain control after tonsillectomy.^(23, 24)

It is preferred to be used by a pack or spray by a syringe on tonsillar bed as its infiltration sometimes cause serious complications such as facial nerve paralysis, Horner syndrome, vocal cord paralysis, cardiac arrhythmia and arrest. Bupivacaine is also used in spinal, epidural anesthesia and peripheral nerve block.⁽²⁵⁻²⁹⁾

It is available in 0.25 %,0.5 %,0.75% concentrations. Its maximum dose is 3 mg /kg. Above that dose, it is toxic. Its onset of action within 5 min and it duration of action extends up to 270-720 min (4.5 -12 hr).⁽²²⁾

MATERIALS AND METHODS

It is a Prospective cohort study that was conducted to collect data that included 120 patients aged 5-18 years who underwent tonsillectomy at Otorhinolaryngology department of Alexandria Main University Hospital.

Patients who undergo tonsillectomy were randomly divided into three groups:

Group A : consists of 40 patients who received Lidocaine 2% (Xylocaine) peritonsillar infiltration 2 cc in one tonsillar bed and posterior pillar intra-operatively,

Group B: consists of 40 patients who received Lidocaine 10%(Xylocaine) spray 2 puff in one tonsillar bed intra-operatively,

Group C: consists of 40 patients who received Bupivacaine 0.5% (Marcaine) solution in one tonsillar bed

spray by a syringe intra-operatively and the other tonsillar bed in each group receives pack with similar amount of normal saline for five minutes as a control group. Before infiltration bending of the needle tip (angulated) for better visualization during infiltration.

Figure-1. Lidocaine 2% infiltration (1cc) in the posterior pillar

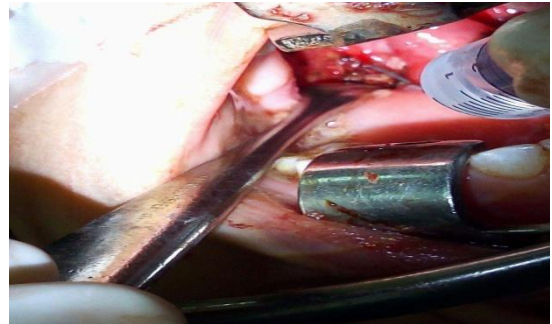


Figure-2. Bupivacaine 0.5% solution (2cc) spray by syringe in the tonsillar bed



All patients received these medications soon after excision of tonsils before recovery from general anesthesia. All patients in all groups had the same premedication and anesthetic technique. During the operation, no analgesia other than the study materials was given.

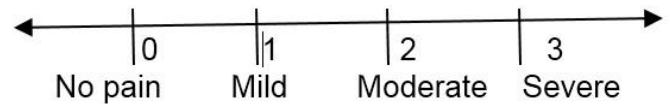
From the first day post-tonsillectomy, an antibiotic (amoxicillin clavulanic acid 600 mg suspension in a dose of 90mg/kg /12 hr was given to all patients in all groups and no analgesia was given in the first day.

From the second day post-tonsillectomy, Paracetamol syrup in a dose of 15 mg/kg/ 6 hr was given as an analgesic to all patients in all groups. Follow up was done immediately postoperative & after 1, 4, 8, 16 and 24 hour after surgery. All patients were discharged home on the same day of surgery. The follow –up data was collected by the nursing parent using a printed out questionnaire using 10mm Visual Analogue scale (0-10) assessing pain, then it is analyzed, and the three groups were compared.

The recorded outcome was done by assessing presence of pain immediately postoperative after recovery from general anesthesia & by using a questionnaire that is given to the nursing parent on discharge to fill in the degree of post-tonsillectomy pain according to Visual Analog Score (VAS) and referred otalgia, it was discussed

and explained in details to the parents to know how to fill it.

Post tonsillectomy pain was assessed using Visual Analog Scale (VAS) from 0 to 3 (where 0 `no pain` and 3 `severe cruciating pain`). Pain assessment was done at specific time interval of 1, 4, 8, 16 and 24 hour after surgery.



It is a simplified form from the original scale where `0` is no pain & `10` is severe cruciating pain.

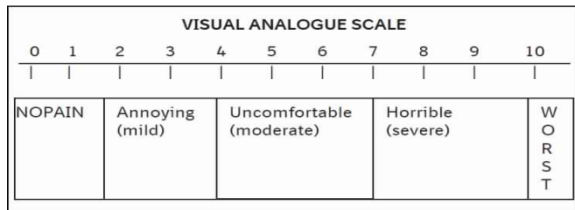
Table-1. Comparison between the two studied groups according to ear pain with lidocaine 2% infiltration Group A

Ear pain	Cases (n=40)		Control (n=40)		χ^2	p
	No.	%	No.	%		
Postoperative	Mean 0.25 ± 0.54		Mean 0.78 ± 0.92			
No pain	32	80.0	19	47.5	9.703*	$^{MC}p=0.014^*$
Mild pain	6	15.0	14	35.0		
Moderate pain	2	5.0	4	10.0		
Severe pain	0	0.0	3	7.5		
1 hour	Mean 0.35 ± 0.70		Mean 0.78 ± 0.86			
No pain	31	77.5	18	45.0	11.519*	$^{MC}p=0.005^*$
Mild pain	4	10.0	15	37.5		
Moderate pain	5	12.5	5	12.5		
Severe pain	0	0.0	2	5.0		
4 hours	Mean 0.25 ± 0.44		Mean 0.78 ± 0.86			
No pain	30	75.0	20	50.0	13.053*	0.001*
Mild pain	10	25.0	9	22.5		
Moderate pain	0	0.0	11	27.5		
Severe pain	0	0.0	0	0.0		
8 hours	Mean 0.30 ± 0.46		Mean 0.83 ± 0.90			
No pain	28	70.0	20	50.0	15.649*	<0.001*
Mild pain	12	30.0	7	17.5		
Moderate pain	0	0.0	13	32.5		
Severe pain	0	0.0	0	0.0		
16 hours	Mean 0.40 ± 0.50		Mean 0.65 ± 0.86			
No pain	24	60.0	24	60.0	14.545*	0.001*
Mild pain	16	40.0	6	15.0		
Moderate pain	0	0.0	10	25.0		
Severe pain	0	0.0	0	0.0		
24 hours	Mean 0.63 ± 0.49		Mean 0.70 ± 0.82			
No pain	15	37.5	21	52.5	17.270*	$^{MC}p<0.001^*$
Mild pain	25	62.5	10	25.0		
Moderate pain	0	0.0	9	22.5		
Severe pain	0	0.0	0	0.0		

χ^2 , p: χ^2 and p values for **Chi square test** for comparing between the two groups

^{MC}p : p value for **Monte Carlo** for Chi square test for comparing between the two groups

*: Statistically significant at $p \leq 0.05$

Figure (3): Visual analogue scale⁽³⁰⁾

An informed consent form was taken from all parents. All information was collected from patients relatives. The nature of the research study was properly explained to them and it's benefit. Parents were instructed to administer their children the prescribed medications in the right dose and to give the appropriate amounts of foods and fluids.

Our purpose was to determine which method of local anaesthesia is better than the other, is it Lidocaine 2% infiltration or Lidocaine 10 % spray or Bupivacaine 0.5%

spray, regarding postoperative relief of pain and the duration of analgesia.

RESULTS

1. Demographic data:

Age:

The mean age of all groups was 16.63 ± 0.68 with a median of 12. Group A ages ranged from 6 – 18 years with a mean of 16.6 ± 0.69 years , 26 patients were <11.5 years and 14 patients were > 11.5 years. In Group B ages ranged from 5 - 17 years with a mean of 16.5 ± 0.65 , 28 patients were <11.5 years and 12 patients were > 11.5 years. And in Group C ages ranged from 5 - 18 years with a mean of 16.8 ± 0.7 years , 26 patients were <11.5 years and 14 patients were > 11.5 years. There was no statistical significant difference between the three groups as regard age ($P = 0.138$). Thus, there was no age bias .

Table-2. Comparison between the two studied groups according to ear pain with lidocaine 10% spray

Ear pain	Cases (n=40)		Control (n=40)		χ^2	MC_p
	No.	%	No.	%		
Postoperative	0.23 ± 0.42		0.58 ± 1.06			
No pain	31	77.5	29	72.5	8.427*	0.022*
Mild pain	9	22.5	4	10.0		
Moderate pain	0	0.0	2	5.0		
Severe pain	0	0.0	5	12.5		
1 hour	0.25 ± 0.44		0.48 ± 0.91			
No pain	30	75.0	29	72.5	5.236	0.111
Mild pain	10	25.0	6	15.0		
Moderate pain	0	0.0	2	5.0		
Severe pain	0	0.0	3	7.5		
4 hours	0.28 ± 0.45		0.78 ± 1.0			
No pain	29	72.5	22	55.0	11.341*	0.006*
Mild pain	11	27.5	8	20.0		
Moderate pain	0	0.0	7	17.5		
Severe pain	0	0.0	3	7.5		
8 hours	0.48 ± 0.68		0.83 ± 1.11			
No pain	25	62.5	23	57.5	6.806	0.071
Mild pain	11	27.5	6	15.0		
Moderate pain	4	10.0	6	15.0		
Severe pain	0	0.0	5	12.5		
16 hours	0.40 ± 0.63		0.95 ± 1.15			
No pain	27	67.5	21	52.5	9.329*	0.021*
Mild pain	10	25.0	6	15.0		
Moderate pain	3	7.5	7	17.5		
Severe pain	0	0.0	6	15.0		
24 hours	0.43 ± 0.75		0.53 ± 0.82			
No pain	29	72.5	25	62.5	6.009	0.091
Mild pain	5	12.5	11	27.5		
Moderate pain	6	15.0	2	5.0		
Severe pain	0	0.0	2	5.0		

χ^2 , p: χ^2 and p values for **Chi square test** for comparing between the two groups

MC_p : p value for **Monte Carlo** for Chi square test for comparing between the two groups

*: Statistically significant at $p \leq 0.05$

Table-3. Comparison between the two studied groups according to ear pain with bupivacaine 0.5% spray

Ear pain	Cases (n=40)		Control (n=40)		χ^2	p
	No.	%	No.	%		
Postoperative	0.20 ± 0.41		0.98 ± 1.10			
No pain	32	80.0	19	47.5	16.749*	$^{MC}p=0.001^*$
Mild pain	8	20.0	8	20.0		
Moderate pain	0	0.0	8	20.0		
Severe pain	0	0.0	5	12.5		
1 hour	0.23 ± 0.42		1.03 ± 1.10			
No pain	31	77.5	18	45.0	18.206*	$^{MC}p<0.001^*$
Mild pain	9	22.5	8	20.0		
Moderate pain	0	0.0	9	22.5		
Severe pain	0	0.0	5	12.5		
4 hours	0.33 ± 0.47		1.0 ± 1.06			
No pain	27	67.5	18	45.0	17.762*	$^{MC}p<0.001^*$
Mild pain	13	32.5	8	20.0		
Moderate pain	0	0.0	10	25.0		
Severe pain	0	0.0	4	10.0		
8 hours	0.38 ± 0.49		0.93 ± 1.12			
No pain	25	62.5	21	52.5	17.588*	$^{MC}p<0.001^*$
Mild pain	15	37.5	6	15.0		
Moderate pain	0	0.0	8	20.0		
Severe pain	0	0.0	5	12.5		
16 hours	0.40 ± 0.50		0.93 ± 1.12			
No pain	24	60.0	21	52.5	20.673*	$^{MC}p<0.001^*$
Mild pain	16	40.0	5	12.5		
Moderate pain	0	0.0	9	22.5		
Severe pain	0	0.0	5	12.5		
24 hours	0.43 ± 0.50		0.75 ± 0.84			
No pain	23	57.5	20	50.0	12.024*	0.002*
Mild pain	17	42.5	10	25.0		
Moderate pain	0	0.0	10	25.0		
Severe pain	0	0.0	0	0.0		

χ^2 , p: χ^2 and p values for **Chi square test** for comparing between the two groups

^{MC}p : p value for **Monte Carlo** for Chi square test for comparing between the two groups

*: Statistically significant at $p \leq 0.05$

Sex:

In group A males were 26 (65%) and in group II were 13 (32.5%) and in group III were 19 (47.5%) while females in group I were 14 (35%) and in group II were 27 (67.5%) and in group III were 21 (52.5%). There was no statistical significant difference between the three groups as regard sex ($P=0.003$). Thus, there was no sex bias .

2. Post-operative otalgia:

By comparing cases and control of group A, there is statistical significant difference according to the frequency of otalgia postoperative till 1st 24 hours after surgery. While when comparing cases and control in Group B there is statistical significant difference postoperative , 4 hours & 16 hours only after surgery .Also by comparing cases and control in Group C there is significant statistical difference as postoperative till 1st 24

hours after surgery . Increased frequency of post operative otalgia is present with control side(saline).

3. Post-operative throat pain

By comparing cases and control of group A there is significant statistical difference according to the frequency of throat pain postoperative till 1st 16 hours after surgery.

While when comparing cases and control in Group B there is statistical significant difference postoperative till 1st 24 hours after surgery .Also by comparing cases and control in Group C there is significant statistical difference postoperative till 1st 24 hours after surgery . It appears that increased frequency of postoperative throat pain is present with control side (saline).

The effect of Bupivacaine 0.5% is more prolonged than both Lidocaine 10% spray and Lidocaine 2% infiltration in reducing postoperative throat pain and referred otalgia.

10% spray or Bupivacaine 0.5% spray by syringe in one tonsillar bed and the other tonsillar bed in each group

Table-4. Comparison between the two studied groups according to throat pain with lidocaine 2% infiltration

Throat pain	Cases (n=40)		Control (n=40)		χ^2	^{MC}p
	No.	%	No.	%		
Postoperative	0.25 ± 0.54		1.53 ± 1.09			
No pain	32	80.0	10	25.0	30.936*	<0.001*
Mild pain	6	15.0	7	17.5		
Moderate pain	2	5.0	15	37.5		
Severe pain	0	0.0	8	20.0		
1 hour	0.23 ± 0.48		1.30 ± 1.14			
No pain	32	80.0	12	30.0	24.215*	<0.001*
Mild pain	7	17.5	13	32.5		
Moderate pain	1	2.5	6	15.0		
Severe pain	0	0.0	9	22.5		
4 hours	0.33 ± 0.66		1.10 ± 1.10			
No pain	31	77.58	16	40.0	13.755*	0.002*
Mild pain	5	12.5	10	25.0		
Moderate pain	4	10.0	8	20.0		
Severe pain	0	0.0	6	15.0		
8 hours	0.25 ± 0.44		0.75 ± 0.81			
No pain	30	75.0	19	47.5	12.468*	0.002*
Mild pain	10	25.0	12	30.0		
Moderate pain	0	0.0	9	22.5		
Severe pain	0	0.0	0	0.0		
16 hours	0.38 ± 0.49		0.80 ± 0.72			
No pain	25	62.5	15	37.5	10.056*	0.006*
Mild pain	15	37.5	18	45.0		
Moderate pain	0	0.0	7	17.5		
Severe pain	0	0.0	0	0.0		
24 hours	0.48 ± 0.60		0.68 ± 0.69			
No pain	23	57.5	18	45.0	1.957	0.361
Mild pain	15	37.5	17	42.5		
Moderate pain	2	5.0	5	12.5		
Severe pain	0	0.0	0	0.0		

χ^2 , p: χ^2 and p values for **Chi square test** for comparing between the two groups

^{MC}p : p value for **Monte Carlo** for Chi square test for comparing between the two groups

*: Statistically significant at $p \leq 0.05$

DISCUSSION

Tonsillectomy has a high incidence of postoperative pain. There is still debate about the optimal analgesia for this common surgical procedure. Different methods have been described and used to reduce pain including; improved intraoperative anesthetic pain regimens, use of corticosteroids, adjustment of surgical technique, and intraoperative local anesthetic injection. Successful management provides a major challenge for the providers of health care.⁽³¹⁾

The present study under discussion included 120 patients, aged 5-18 years undergo tonsillectomy who were randomized to three equal groups with either peritonsillar region infiltrated by Lidocaine 2%, Lidocaine

receives pack with similar amount of normal saline for five minutes as a control group. The aim was to investigate the effects of infiltration of local agents on postoperative pain in tonsillectomy.

Demographic data:

Age of tonsillectomized patients:

The selection of patients included in this study to be 5-18 years was to ensure better reliability of the scores of the subjective VAS. In the current study, the mean age was 16.63 ± 0.68 with a median of 12. It was reported to be 15.9 ± 7.1 years by Erickson et al., (2009) investigating 35 year epidemiological trends in tonsillectomy and adenotonsillectomy conducted on 8106 patients.⁽³²⁾

Sex of tonsillectomized patients:

Table-5. Comparison between the two studied groups according to throat pain with lidocaine 10% spray

Throat pain	Cases (n=40)		Control (n=40)		χ^2	^{MC}p
	No.	%	No.	%		
Postoperative	0.28 ± 0.45		0.80 ± 0.85			
No pain	29	72.5	18	45.0	12.222*	0.003*
Mild pain	11	27.5	13	32.5		
Moderate pain	0	0.0	8	20.0		
Severe pain	0	0.0	1	2.5		
1 hour	0.43 ± 0.55		0.95 ± 1.01			
No pain	24	60.0	18	45.0	12.532*	0.004*
Mild pain	15	37.5	9	22.5		
Moderate pain	1	2.5	10	25.0		
Severe pain	0	0.0	3	7.5		
4 hours	0.48 ± 0.55		0.83 ± 0.93			
No pain	22	55.0	19	47.5	8.549*	0.024*
Mild pain	17	42.5	11	27.5		
Moderate pain	1	2.5	8	20.0		
Severe pain	0	0.0	2	5.0		
8 hours	0.55 ± 0.54		1.03 ± 1.10			
No pain	19	47.5	17	42.5	12.186*	0.005*
Mild pain	20	50.0	11	27.5		
Moderate pain	1	2.5	6	15.0		
Severe pain	0	0.0	6	15.0		
16 hours	0.58 ± 0.75		1.15 ± 1.08			
No pain	23	57.5	15	37.5	8.181*	0.034*
Mild pain	11	27.5	9	22.5		
Moderate pain	6	15.0	11	27.5		
Severe pain	0	0.0	5	12.5		
24 hours	0.60 ± 0.67		1.10 ± 1.06			
No pain	20	50.0	16	40.0	10.716*	0.011*
Mild pain	16	40.0	8	20.0		
Moderate pain	4	10.0	12	30.0		
Severe pain	0	0.0	4	10.0		

χ^2 , p: χ^2 and p values for **Chi square test** for comparing between the two groups

^{MC}p : p value for **Monte Carlo** for Chi square test for comparing between the two groups

*: Statistically significant at $p \leq 0.05$

There was a male predominance in the current study, male : female 54.16% : 45.83%. There was no statistical difference between the three studied groups as regards age ($P = 0.138$) and sex ($P = 0.003$), which indicates the absence of bias in these two parameters. Thus, they are quite comparable and with no statistical biases.

Post tonsillectomy otalgia:

In the current study, increased frequency of post operative otalgia is present with controls (saline) compared to cases in the three groups within 24 hours after tonsillectomy which is a statistical difference that indicates a good advantage of local anesthetics on reducing postoperative otalgia.

Post tonsillectomy pain:

Drugs used:

Lidocaine 10% spray: Analgesic spray is a novel administration for postoperative pain control. It is

delivered by a pump. Such sprays are topical, meaning that they are applied to the surfaces of the body, most commonly the skin, but sometimes to the mucous membranes, such as the throat. A common reason for using an analgesic spray or other topical pain killer, rather than a painkiller taken by mouth, is that topical treatments work directly on the affected area.⁽³³⁾

Lidocaine 2% infiltration: Its effect showed longer duration of action in reducing postoperative pain in comparison to Lidocaine 10% spray.⁽²²⁾

Bupivacaine 0.5 % spray: It has the advantage of more prolonged postoperative pain control up to 24 hours in comparison to both Lidocaine 10% spray and Lidocaine 2% infiltration. E. Haq, I.H. Udaipurwala et al., (2009) conducted a multicenteric case control study of 205 patients. The patients underwent tonsillectomy by diathermy. After tonsillectomy and securing haemostasis, a pack soaked in 0.5% bupivacaine

solution was put in one tonsillar fossa and a pack soaked in normal saline (control) was put in the other tonsillar fossa. Then after five minutes both packs were removed.⁽³⁴⁾

They concluded that topical application of bupivacaine pack in the tonsillar fossa is an effective method to reduce pain after tonsillectomy. It is a safe method and no complication is as associated with this technique. Pain

Table-6. Comparison between the two studied groups according to throat pain with bupivacaine 0.5% spray

Throat pain	Cases (n=40)		Control (n=40)		χ^2	p
	No.	%	No.	%		
Postoperative	0.48 ± 0.72		1.68 ± 0.97			
No pain	26	65.0	6	15.0	28.190*	χ^2_{MC} p <0.001*
Mild pain	9	22.5	9	22.5		
Moderate pain	5	12.5	17	42.5		
Severe pain	0	0.0	8	20.0		
1 hour	0.48 ± 0.64		1.63 ± 1.0			
No pain	24	60.0	5	12.5	26.360*	<0.001*
Mild pain	13	32.5	15	37.5		
Moderate pain	3	7.5	10	25.0		
Severe pain	0	0.0	10	25.0		
4 hours	0.35 ± 0.58		1.43 ± 1.01			
No pain	28	70.0	7	17.5	26.906*	χ^2_{MC} p <0.001*
Mild pain	10	25.0	17	42.5		
Moderate pain	2	5.0	8	20.0		
Severe pain	0	0.0	8	20.0		
8 hours	0.63 ± 0.70		1.58 ± 1.03			
No pain	20	50.0	6	15.0	18.681*	<0.001*
Mild pain	15	37.5	15	37.5		
Moderate pain	5	12.5	9	22.5		
Severe pain	0	0.0	10	25.0		
16 hours	0.78 ± 0.77		1.75 ± 1.10			
No pain	17	42.5	9	22.5	24.702*	<0.001*
Mild pain	15	37.5	3	7.5		
Moderate pain	8	20.0	17	42.5		
Severe pain	0	0.0	11	27.5		
24 hours	0.80 ± 0.76		1.83 ± 1.06			
No pain	16	40.0	5	12.5	20.910*	<0.001*
Mild pain	16	40.0	11	27.5		
Moderate pain	8	20.0	10	25.0		
Severe pain	0	0.0	14	35.0		

χ^2_{MC} , p: χ^2 and p values for **Chi square test** for comparing between the two groups

p: p value for **Monte Carlo** for Chi square test for comparing between the two groups

*: Statistically significant at $p \leq 0.05$

Post tonsillectomy pain was assessed separately on two sides of the throat using Visual Analog Scale (VAS). Pain assessment was done at specific time interval 1,4,8,16 and 24 hours after the surgery.

The results showed difference of mean pain control between case and control sides at 1st hour was 2.32, at 4th hour 1.23, at 8th hour 1.80, at 16 hour 1.71 and at 24th hour it was 0.6, showing that pain control was very effective at 1st hour but the difference was still present till 24 hours. In addition, no complication, reaction or side effect of bupivacaine was noted in any case in this study.⁽³⁴⁾

reduction is seen in immediate post-operative period which remains for along time up to 24 hours after surgery.⁽³⁴⁾

The results in the previous study concur with the present study findings as the difference of mean pain control between case and control sides in Group C Bupivacaine 0.5% postoperative was 1.2, at 1st hour was 1.15, at 4th hour was 1.08, at 8th hour was 0.95, at 16 hour was 0.97 and at 24th hour was 1.03, showing that pain control was very effective at 1st hour but the difference was still present till 24 hours. The same also, no complication, reaction or side effect of bupivacaine was noted in any case in the present study.⁽³⁴⁾

On the contrary to the present study results, Hydri AS et al. (2010), conducted a randomized control trial on forty-six patients of either gender, aged 10-42 years underwent tonsillectomy for recurrent tonsillitis. At the end of surgery, having secured haemostasis, one tonsillar fossa was randomly packed with a gauze piece soaked in 3 ml of 0.5% bupivacaine for 5 minutes, while the other was not. Effects of postoperative analgesia were assessed using visual analogue scale (VAS) up to 8 hours.⁽³⁵⁾

The results were that majority of the patients (85%, n=39) failed to experience an appreciable pain relief on the side of local anaesthetic (bupivacaine) application ($p=0.006$). So they concluded that topical application of local anaesthetic (bupivacaine) confers no appreciable pain control in post-tonsillectomy patients.⁽³⁵⁾

Grainer J et al. (2008) conducted a systematic review and meta-analysis regarding local anaesthetic use, either by infiltration or topical application, for post-tonsillectomy pain reduction.

Thirteen studies were included. Overall, local anaesthetic, applied topically or infiltrated, significantly reduces pain scores compared with controls at 4-6 h, -0.66 (95% CI: -0.82, -0.50); 20-24 h, -0.34 (95% CI: -0.51, -0.18) and on day 5, -0.97 (95% CI: -1.30, -0.63) (standardised mean differences). These changes approximate to a reduction in pain between 7 and 19 mm on a 0-100 mm visual analogue scale.⁽³⁶⁾

They concluded that local anaesthetic provides a modest reduction in post-tonsillectomy pain. Topical local anaesthetic should be the method of choice for providing post-operative analgesia.⁽³⁶⁾

CONCLUSION

From this study, we conclude that:

Topical application of local anesthetic in the tonsillar bed after tonsillectomy results in significant reduction of postoperative throat pain and referred otalgia. Local anesthetic application after tonsillectomy should be used. Bupivacaine showed more prolonged duration in reducing postoperative pain.

Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of this paper.

References

- [1]. Lane JC, Dworkin-Valenti J, Chiodo L, Haupt M. Postoperative tonsillectomy bleeding complications in children: A comparison of three surgical techniques. *International journal of pediatric otorhinolaryngology*. 2016;88:184-8.
- [2]. Lipman DS. Tonsillectomy techniques. *Archives of otolaryngology--head & neck surgery*. 2005;131(3):279.
- [3]. Tay HL. Post-operative morbidity in electrodissection tonsillectomy. *The Journal of laryngology and otology*. 1995;109(3):209-11.
- [4]. Ashbach MN, Ostrower ST, Parikh SR. Tonsillectomy techniques and pain: a review of randomized controlled trials and call for standardization. *ORL; journal for oto-rhino-laryngology and its related specialties*. 2007;69(6):364-70.
- [5]. Cohen N, Sommer DD. Post-tonsillectomy pain control: consensus or controversy? *Pain management*. 2016;6(1):31-7.
- [6]. Gupta AK, Gupta S, Meena DS, Sharma U. Post-tonsillectomy pain: Different modes of pain relief. *Indian journal of otolaryngology and head and neck surgery : official publication of the Association of Otolaryngologists of India*. 2002;54(2):136-9.
- [7]. Salam MA, Cable HR. Post-tonsillectomy pain with diathermy and ligation techniques. A prospective randomized study in children and adults. *Clinical otolaryngology and allied sciences*. 1992;17(6):517-9.
- [8]. Akural EI, Koivunen PT, Teppo H, Alahuhta SM, Lopponen HJ. Post-tonsillectomy pain: a prospective, randomised and double-blinded study to compare an ultrasonically activated scalpel technique with the blunt dissection technique. *Anaesthesia*. 2001;56(11):1045-50.
- [9]. Swapna Gurrapu and Estari Mamidala. In vitro HIV-Reverse Transcriptase Inhibition of Andrographolide Isolated from *Andrographis paniculata*. *European Journal of Biomedical and Pharmaceutical Sciences*. 2017. Volume 4, Issue 12. 516-522.
- [10]. Atallah N, Kumar M, Hilali A, Hickey S. Post-operative pain in tonsillectomy: bipolar electrodissection technique vs dissection ligation technique. A double-blind randomized prospective trial. *The Journal of laryngology and otology*. 2000;114(9):667-70.
- [11]. Izny Hafiz Z, Rosdan S, Mohd Khairi MD. Coblation tonsillectomy versus dissection tonsillectomy: a comparison of intraoperative time, intraoperative blood loss and post-operative pain. *The Medical journal of Malaysia*. 2014;69(2):74-8.
- [12]. Elbadawey MR, Hegazy HM, Eltahan AE, Powell J. A randomised controlled trial of coblation, diode laser and cold dissection in paediatric tonsillectomy. *The Journal of laryngology and otology*. 2015;129(11):1058-63.
- [13]. Jones DT, Kenna MA, Guidi J, Huang L, Johnston PR, Licameli GR. Comparison of postoperative pain in pediatric patients undergoing coblation tonsillectomy versus cautery tonsillectomy. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*. 2011;144(6):972-7.
- [14]. Carr MM, Muecke CJ, Sohmer B, Nasser JG, Finley GA. Comparison of postoperative pain: tonsillectomy by blunt dissection or electrocautery dissection. *The Journal of otolaryngology*. 2001;30(1):10-4.
- [15]. Cook AJ, Woolf CJ, Wall PD, McMahon SB. Dynamic receptive field plasticity in rat spinal cord

- dorsal horn following C-primary afferent input. *Nature*. 1987;325(7000):151-3.
- [16]. Iodice FG, Testa G. Pain relief in patients undergoing tonsillectomy. *Archives of trauma research*. 2013;2(1):56-7.
 - [17]. Amani S, Abedinzadeh MR. Effects of Oral Gabapentin, Local Bupivacaine and Intravenous Pethidine on Post Tonsillectomy Pain. *Iranian journal of otorhinolaryngology*. 2015;27(82):343-8.
 - [18]. Akoglu E, Akkurt BC, Inanoglu K, Okuyucu S, Dagli S. Ropivacaine compared to bupivacaine for post-tonsillectomy pain relief in children: a randomized controlled study. *International journal of pediatric otorhinolaryngology*. 2006;70(7):1169-73.
 - [19]. Afman CE, Welge JA, Steward DL. Steroids for post-tonsillectomy pain reduction: meta-analysis of randomized controlled trials. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*. 2006;134(2):181-6.
 - [20]. Ju NY, Cui GX, Gao W. Ropivacaine plus dexamethasone infiltration reduces postoperative pain after tonsillectomy and adenoidectomy. *International journal of pediatric otorhinolaryngology*. 2013;77(11):1881-5.
 - [21]. Kedek A, Derbent A, Uyar M, Bilgen C, Uyar M, Kirazli T, et al. Pre-emptive effects of ibuprofen syrup and lidocaine infiltration on post-operative analgesia in children undergoing adenotonsillectomy. *The Journal of international medical research*. 2005;33(2):188-95.
 - [22]. Morgan GE, Mikhail MS, Murray MJ. *Clinical Anesthesiology*: McGraw-Hill Education; 2005.
 - [23]. Malamed SF. *Handbook of Local Anesthesia - E-Book*: Elsevier Health Sciences; 2014.
 - [24]. Somdas MA, Senturk M, Ketenci I, Erkorkmaz U, Unlu Y. Efficacy of bupivacaine for post-tonsillectomy pain: a study with the intra-individual design. *International journal of pediatric otorhinolaryngology*. 2004;68(11):1391-5.
 - [25]. Honarmand A, Safavi M, Naghibi K, Attari M, Soltani M, Amoushahi M, et al. Preemptive peritonsillar infiltration with bupivacaine in combination with tramadol improves pediatric post-tonsillectomy pain better than using bupivacaine or tramadol alone: A randomized, placebo-controlled, double blind clinical trial. *Advanced biomedical research*. 2015;4:132.
 - [26]. Shlizerman L, Ashkenazi D. Peripheral facial nerve paralysis after peritonsillar infiltration of bupivacaine: a case report. *American journal of otolaryngology*. 2005;26(6):406-7.
 - [27]. Hobson JC, Malla JV, Kay NJ. Horner's syndrome following tonsillectomy. *The Journal of laryngology and otology*. 2006;120(9):800-1.
 - [28]. Weksler N, Nash M, Rozentsveig V, Schwartz J, Schily M, Gurman G. Vocal cord paralysis as a consequence of peritonsillar infiltration with bupivacaine. *Acta anaesthesiologica scandinavica*. 2001;45(8):1042-4.
 - [29]. Ryu HY, Kim J-Y, Lim HK, Yoon J, Yoo B-S, Choe K-H, et al. Bupivacaine induced cardiac toxicity mimicking an acute non-ST segment elevation myocardial infarction. *Yonsei medical journal*. 2007;48(2):331-6.
 - [30]. Hadzic A. *Hadzic's Textbook of Regional Anesthesia and Acute Pain Management, Second Edition*: McGraw-Hill Education; 2017.
 - [31]. Abend R, Dan O, Maoz K, Raz S, Bar-Haim Y. Reliability, validity and sensitivity of a computerized visual analog scale measuring state anxiety. *Journal of behavior therapy and experimental psychiatry*. 2014;45(4):447-53.
 - [32]. O'Leary S, Vorrath J. Postoperative bleeding after diathermy and dissection tonsillectomy. *The Laryngoscope*. 2005;115(4):591-4.
 - [33]. Erickson BK, Larson DR, St. Sauver JL, Meverden RA, Orvidas LJ. Changes in incidence and indications of tonsillectomy and adenotonsillectomy, 1970-2005. *Otolaryngology--Head and Neck Surgery*. 2009;140(6):894-901.
 - [34]. Doukumo D, Faponle A, Adenekan A, Olateju S, Bolaji B. Effects of lidocaine and k-y jellies on sore throat, cough, and hoarseness following endotracheal anaesthesia. *Journal of the West African College of Surgeons*. 2011;1(3):44-61.
 - [35]. Ehsan-ul-Haq, Udaipurwala IH, Farrukh MS. Post-tonsillectomy pain reduced by application of bupivacaine pack in the tonsillar fossa. *Pak J Surg* 2009; 25(2):76-9.
 36. Hydri AS, Malik SM. Post-tonsillectomy pain and bupivacaine, an intra individual design study. *Journal of the College of Physicians and Surgeons--Pakistan : JCPSP*. 2010;20(8):538-41.
 37. Grainger J, Saravanappa N. Local anaesthetic for post-tonsillectomy pain: a systematic review and meta-analysis. *Clinical otolaryngology : official journal of ENT-UK ; official journal of Netherlands Society for Oto-Rhino-Laryngology & Cervico-Facial Surgery*. 2008;33(5):411-9.